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ONLINE SUPPLEMENT

Timing of secondhand smoke, pet, dampness or mold exposure and lung function in adolescence.

Edith B Milanzi, Gerard H Koppelman, Henriette A Smit, Alet H Wijga, Judith M Vonk, Bert Brunekreef, and

Ulrike Gehring

Characteristics	Baseline (N=3963)		Study population (N=552)		P-value ^Ω	Lung function data at age 12, but not at age 16 (N=740) ^α		P-value ^μ
	N	%	N	%		N	%	
Parental allergy								
Allergic mother	1237/3963	31.2	178/552	32.2	0.624	252/740	34.0	0.495
Allergic father	1217/3957	30.7	187/364	33.9	0.130	229/740	30.9	0.255
Boys	2054/3963	51.8	251/552	45.4	0.002	383/740	51.1	0.025
Presence of pets at 1 year	1719/3785	45.4	226/489	41.1	0.009	314/650	42.6	0.600
Dampness or molds at 1 year	312/3386	8.4	49/540	9.1	0.243	47/723	6.5	0.087
Breastfeeding > 12 weeks	1892/3896	48.5	330/552	59.7	<0.001	392/737	53.2	0.018
Gas cooking at 3 months	3247/3923	82.7	471/549	85.8	0.076	599/737	81.2	0.032
Maternal smoking during pregnancy	703/3920	17.8	68/548	12.4	0.003	118/736	16.0	0.065
Indoor SHS at 1 year	1059/3963	27.7	109/552	19.7	<0.001	187/739	25.3	0.014
Parental education					<0.001			0.001
Low	502/3812	13.1	38/552	6.8		81/739	10.9	
Intermediate	1402/3812	36.7	167/552	30.2		263/739	35.5	
High	1908/3812	50.1	347/552	62.8		395/739	53.4	
Parental country of birth (Netherlands)	3485/3700	94.1	530/545	97.2	0.007	699/735	95.1	0.056

Table E1. Characteristics comparisons between baseline population and study population*

Ω: Comparison between baseline population and study population

α: Excluded from population with successful lung function measurements at age 12 (N=1292) because of lack of lung function data at age 16

μ : Comparison between study population and excluded population with lung function data at age 12, but not at age 16

*Characteristics compared using Chi-Square tests

Number surveys with missing exposure data	N (%)
SHS	
0	511 (92.6)
1	33 (6.0)
2	5 (0.9)
3	3 (0.5)
Pets	
0	515 (93.3)
1	25 (4.5)
2	8 (1.4)
3	3 (0.5)
5	1 (0.2)
Dampness or mold	
0	417 (75.5)
1	119 (21.6)
2	10 (1.8)
3	5 (0.9)
4	1 (0.2)

Table E2. Completeness of exposure data from repeated surveys from birth until age 12

Characteristics	Pets		SHS		Dampness or mold	
Low education vs High education	Very low	1.0	Very low	1.00	Very low	1.00
	Late childhood	0.9 (0.3 to 3.1)	Early life	2.9 (1.1 to 8.1)	Early life	0.9 (0.3 to 2.9)
	Mid-childhood	0.8 (0.1 to 3.16)	Persistently low	3.1 (1.2 to 8.6)	Moderate late childhood	0.8 (0.3 to 2.1)
	Early life	0.8 (0.2 to 3.1)	Childhood	5.3 (2.1 to 13.8)	Mid-childhood	0.5 (0.0 to 4.2)
	Persistently high	2.2 (1.0. to 4.8)				
Intermediate education vs high education	Very low	1.0	Very low	1.00	Very low	1.00
	Late childhood	0.9 (0.5 to 1.8)	Early life	1.5 (0.8 to 2.9)	Early life	1.0 (0.5 to 1.9)
	Mid-childhood	1.2 (0.5 to 2.5)	Persistently low	1.2 (0.6 to 2.43)	Moderate late childhood	0.6 (0.3 to 1.1)
	Early life	1.9 (1.1 to 3.4)	Childhood	2.9 (1.5 to 5.3)	Mid-childhood	0.8 (0.3 to 2.1)
	Persistently high	2.1 (1.3 to 3.3)				
Parental allergy (Yes vs No)	Very low	1.0	Very low	1.00	Very low	1.00
	Late childhood	0.7 (0.4 to 1.2)	Early life	0.5 (0.3 to 0.9)	Early life	0.7 (0.4 to 1.3)
	Mid-childhood	0.5 (0.2 to 1.0)	Persistently low	0.9 (0.4 to 1.6)	Moderate late childhood	0.8 (0.5 to 1.4)
	Early life	0.9 (0.5 to 1.6)	Childhood	0.5 (0.3 to 0.9)	Mid-childhood	1.0 (0.4 to 2.4)
	Persistently high	0.5 (0.3 to 0.8)				
SHS exposure at 1 year (Yes vs No)	Very low	1.0	Very low	1.00	Very low	1.00
	Late childhood	1.3 (0.6 to 2.7)	Early life		Early life	1.2 (0.6 to 2.3)
	Mid-childhood	1.4 (0.5 to 3.3)	Persistently low		Moderate late childhood	1.0 (0.5 to 1.8)
	Early life	3.0 (1.6 to 5.6)	Childhood		Mid-childhood	0.8 (0.2to 2.4)
	Persistently high	1.8 (1.1 to 3.1)				
Maternal smoking during pregnancy (Yes vs No)	Very low	1.0	Very low	1.00	Very low	1.00
	Late childhood	0.7 (0.2 to 2.3)	Early life		Early life	1.2 (0.5 to 2.6)
	Mid-childhood	1.8 (0.7 to 5..1)	Persistently low		Moderate late childhood	1.1 (0.5 to 2.3)
	Early life	3.7 (1.7 to .7)	Childhood		Mid-childhood	1.5 (0.5 to 4.5)
	Persistently high	2.0 (1.1 to 4.1)				
Gas cooking (Yes vs No)	Very low	1.0	Very low	1.00	Very low	1.00
	Late childhood	0.9 (0.4 to 2.1)	Early life	2.0 (0.7 to 5.8)	Early life	1.4 (0.5 to 3.4)
	Mid-childhood	0.8 (0.3 to 2.1)	Persistently low	0.6 (0.3 to 1.3)	Moderate late childhood	0.8 (0.4 to 1.5)
	Early life	0.9 (0.4 to 2.0)	Childhood	1.0 (0.4 to 2.2)	Mid-childhood	0.8 (0.2 to 2.4)
	Persistently high	1.2 (0.6 to 2.3)				

Table E3. Univariate associations of longitudinal exposure patterns with selected study characteristics presented as odds ratios (95% confidence interval).

	AGE 12		AGE 16	
% Difference in FEV ₁ (95% CI)	CRUDE ^α	ADJUSTED ^β	CRUDE ^α	ADJUSTED ^β
SHS	N=552	N=526	N=552	N=526
Early life vs Very low	-1.02 (-2.53 to 0.52)	-1.43 (-3.02 to 0.18)	0.45 (-1.09 to 2.01)	0.34 (-1.28 to 1.98)
Persistently low vs Very low	-1.69 (-3.29 to -0.05)	-1.77 (-3.45 to -0.06)	-1.16 (-2.76 to 0.46)	-0.97 (-2.64 to 0.72)
Childhood vs Very low	-0.92 (-2.43 to 0.61)	-0.95 (-2.57 to 0.69)	-2.32 (-3.80 to -0.82)	-1.88 (-3.47 to -0.26)
Pets	N=552	N=524	N=552	N=524
Early life vs Very low	-0.85 (-2.14 to 0.46)	-0.55 (-1.91 to 0.82)	-0.49 (-1.78 to 0.83)	0.10 (-1.25 to 1.48)
Mid-childhood vs Very low	0.83 (-0.77 to 2.45)	1.32 (-0.34 to 3.00)	-0.08 (-1.65 to 1.52)	0.91 (-0.73 to 2.57)
Late childhood vs Very low	2.30 (0.94 to 3.68)	2.71 (1.26 to 4.18)	3.66 (2.29 to 5.05)	4.78 (3.32 to 6.27)
Persistently high vs Very low	0.99 (-0.01 to 2.01)	1.31 (0.21 to 2.42)	0.55 (-0.47 to 1.57)	1.29 (0.19 to 2.39)
Dampness or mold	N=552	N=534	N=552	N=534
Early life vs Very low	2.10 (0.59 to 3.64)	2.28 (0.74 to 3.84)	-0.32 (-1.80 to 1.19)	-0.21 (-1.72 to 1.32)
Moderate late childhood vs Very low	-3.00 (-4.29 to -1.70)	-2.96 (-4.26 to -1.64)	-2.64 (-3.94 to -1.33)	-2.77 (-4.08 to -1.44)
Mid-childhood vs Very low	-2.97 (-5.12 to -0.76)	-2.58 (-4.78 to -0.33)	-2.00 (-4.20 to 0.24)	-2.00 (-4.22 to 0.26)
% Difference in FVC (95% CI)				
SHS	N=552	N=526	N=552	N=526
Early life vs Very low	-1.67 (-3.08 to -0.24)	-2.17 (-3.65 to -0.67)	-0.69 (-1.98 to 0.62)	-0.49 (-1.85 to 0.89)
Persistently low vs Very low	-2.10 (-3.60 to -0.57)	-1.94 (-3.50 to -0.33)	-1.21 (-2.56 to 0.17)	-0.82 (-2.25 to 0.62)
Childhood vs Very low	-1.54 (-2.95 to -0.11)	-1.96 (-3.45 to -0.43)	-2.33 (-3.59 to -1.06)	-1.82 (-3.18 to -0.44)
Pets	N=552	N=524	N=552	N=524
Early life vs Very low	0.12 (-1.11 to 1.37)	0.21 (-1.07 to 1.51)	-0.91 (-2.01 to 0.20)	-0.51 (-1.66 to 0.66)
Mid-childhood vs Very low	-0.25 (-1.74 to 1.26)	0.13 (-1.41 to 1.69)	-0.91 (-2.24 to 0.43)	-0.14 (-1.52 to 1.27)
Late childhood vs Very low	2.36 (1.08 to 3.66)	2.26 (0.91 to 3.36)	1.34 (0.20 to 2.50)	2.21 (0.98 to 3.45)
Persistently high vs Very low	0.71 (-0.24 to 1.66)	0.89 (-0.13 to 1.93)	-0.27 (-1.12 to 0.60)	0.39 (-0.54 to 1.33)
Dampness or mold	N=552	N=534	N=552	N=534
Early life vs Very low	2.44 (1.00 to 3.89)	2.76 (1.31 to 4.24)	0.62 (-0.65 to 1.90)	0.89 (-0.41 to 2.20)
Moderate late childhood vs Very low	-2.10 (-3.32 to -0.86)	-2.11 (-3.35 to -0.86)	-2.15 (-3.26 to -1.03)	-2.36 (-3.48 to -1.22)
Mid-childhood vs Very low	-0.95 (-3.03 to 1.17)	-0.67 (-2.77 to 1.48)	-1.26 (-3.14 to 0.66)	-1.54 (-3.44 to 0.39)

Table E4. Crude and adjusted associations of longitudinal patterns of SHS, pet, and dampness or mold exposure with FEV₁ and FVC at ages 12 and 16 presented as percent difference .

α Adjusted for sex, log transformations of height, weight and age at medical examination, **β** Adjusted for log transformations of height, weight and age at medical examination, parental education, maternal and paternal allergy, breastfeeding at 12 weeks, maternal smoking during pregnancy, average annual NO₂ exposure at birth address, birthweight, indoor SHS at 1 year (except in models with SHS exposure), use of gas for cooking at 3 months, dampness or mold in the child's home at 1 year (except in models with dampness or mold exposure), pets in the home at 1 year(except in models with pet exposure), respiratory infections in the past 3 weeks before medical examination.

	% FEV ₁ Growth/year(95% CI)			% FVC Growth/year (95% CI)		
	Girls	Boys	P-value*	Girls	Boys	P-value*
SHS	N=283	N=241		N=283	N=241	
Early life vs Very low	0.08 (-0.28 to 0.43)	0.68 (0.21 to 1.15)	0.198	-0.07 (-0.44 to 0.31)	0.86 (0.42 to 1.30)	0.118
Persistently low vs Very low	-0.08 (-0.45 to 0.29)	0.61 (0.11 to 1.12)	0.084	0.10 (-0.29 to 0.50)	0.59 (0.12 to 1.07)	0.679
Childhood vs Very low	-0.56 (-0.89 to -0.24)	-0.12 (-0.65 to 0.41)	0.104	-0.50 (-0.84 to -0.15)	0.53 (0.03 to 1.04)	0.000
Pets	N=283	N=241		N=283	N=241	
Early life vs Very low	0.24 (-0.05 to 0.53)	0.08 (-0.33 to 0.49)	0.599	-0.01 (-0.32 to 0.30)	-0.39 (-0.78 to 0.01)	0.213
Mid-childhood vs Very low	-0.28 (-0.63 to 0.08)	0.14 (-0.34 to 0.61)	0.005	0.01 (-0.31 to 0.34)	-0.07 (-0.52 to 0.39)	0.952
Late childhood vs Very low	0.36 (0.05 to 0.66)	0.94 (0.53 to 1.36)	0.004	-0.02 (-0.40 to 0.36)	0.04 (-0.36 to 0.43)	0.818
Persistently high vs Very low	0.02 (-0.21 to 0.24)	-0.21 (-0.54 to 0.13)	0.215	0.01 (-0.23 to 0.25)	-0.33 (-0.65 to -0.01)	0.082
Dampness or mold	N=283	N=241		N=283	N=241	
Early life vs Very low	-0.31 (-0.63 to 0.00)	-1.02 (-1.47 to -0.57)	0.003	-0.21 (-0.54 to 0.12)	-0.76 (-1.19 to -0.34)	0.014
Moderate late childhood vs Very low	-0.22 (-0.53 to 0.09)	0.48 (0.10 to 0.85)	0.015	-0.23 (-0.55 to 0.10)	0.29 (-0.07 to 0.65)	0.004
Mid-childhood vs Very low	-0.25 (-0.78 to 0.28)	0.22 (-0.39 to 0.83)	0.743	0.66 (-1.22 to -0.10)	0.06 (-0.52 to 0.64)	0.237

Table E5. Adjusted associations of longitudinal patterns of SHS, pet, and dampness or mold exposure with FEV₁ and FVC growth between age 12 and 16 stratified by sex. Associations are presented as annual percent growth of FEV₁ and FVC

Adjusted for log transformations of differences in height, weight and age between the 12 and 16 year lung function measurements, parental education, maternal and paternal allergy, breastfeeding at 12 weeks, maternal smoking during pregnancy, average annual NO₂ exposure at birth address, birthweight, indoor SHS at 1 year (except in models with SHS exposure), use of gas for cooking at 3 months, dampness or mold in the child's home at 1 year except in models with dampness or mold exposure, pets in the home at 1 year(except in models with pet exposure), respiratory infections in the past 3 weeks before medical examination

*P-value of interaction terms

% Difference in FEV ₁ (95% CI)	AGE 12		P-value*	AGE 16		P-value*
	Girls	Boys		Girls	Boys	
SHS	N=283	N=241		N=283	N=241	
Early life vs Very low	-0.91 (-2.99 to 1.22)	-2.23 (-4.64 to 0.23)	0.278	0.42 (-1.73 to 2.61)	0.69 (-1.74 to 3.18)	0.735
Persistently low vs Very low	-2.39 (-4.55 to -0.18)	0.15 (-2.49 to 2.87)	0.401	-3.87 (-6.00 to -1.70)	2.83 (0.17 to 5.55)	0.004
Childhood vs Very low	-1.71 (-3.61 to 0.23)	-1.01 (-3.83 to 1.89)	0.904	-3.35 (-5.25 to -1.40)	-0.75 (-3.48 to 2.05)	0.217
Pets	N=283	N=241		N=283	N=241	
Early life vs Very low	-1.87 (-3.52 to -0.19)	0.31 (-1.88 to 2.54)	0.139	-0.63 (-2.33 to 1.10)	0.89 (-1.24 to 3.07)	0.136
Mid-childhood vs Very low	1.73 (-0.44 to 3.94)	2.60 (0.00 to 5.27)	0.226	0.02 (-2.12 to 2.20)	3.20 (0.71 to 5.76)	0.040
Late childhood vs Very low	1.57 (-0.25 to 3.42)	3.88 (1.59 to 6.23)	0.047	2.56 (0.67 to 4.49)	8.42 (6.14 to 10.74)	<0.001
Persistently high vs Very low	1.82 (0.48 to 3.18)	0.20 (-1.57 to 2.01)	0.322	1.79 (0.41 to 3.18)	0.69 (-1.06 to 2.47)	0.463
Dampness or mold	N=283	N=241		N=283	N=241	
Early life vs Very low	1.94 (0.04 to 3.88)	2.47 (-0.00 to 5.01)	0.688	0.33 (-1.58 to 2.27)	-0.52 (-2.87 to 1.89)	0.668
Moderate late childhood vs Very low	-2.86 (-4.63 to -1.06)	-3.04 (-4.98 to -1.06)	0.013	-3.95 (-5.72 to -2.15)	-1.89 (-3.84 to 0.11)	0.135
Mid-childhood vs Very low	-4.20 (-7.25 to -1.05)	-1.82 (-5.01 to 1.48)	0.023	-3.98 (-7.13 to -0.72)	-0.20 (-3.41 to 3.11)	0.079
% Difference in FVC (95% CI)						
SHS	(N=253)	(N=213)		(N=253)	(N=213)	
Early life vs Very low	0.06 (-1.97 to 2.13)	-5.15 (-7.28 to -2.97)	0.001	0.59 (-1.27 to 2.49)	-1.83 (-3.83 to 0.20)	0.089
Persistently low vs Very low	-2.00 (-4.10 to 0.14)	-0.81 (-3.20 to 1.64)	0.760	-2.20 (-4.08 to -0.28)	1.31 (-0.89 to 3.56)	0.147
Childhood vs Very low	-1.11 (-2.95 to 0.78)	-3.98 (-6.47 to -1.42)	0.007	-2.62 (-4.29 to -0.93)	-1.54 (-3.82 to 0.80)	0.555
Pets	(N=254)	(N=212)		(N=254)	(N=212)	
Early life vs Very low	-0.60 (-2.23 to 1.05)	1.16 (-0.86 to 3.22)	0.340	-0.31 (-1.79 to 1.20)	-0.29 (-2.09 to 1.54)	0.530
Mid-childhood vs Very low	1.55 (-0.55 to 3.70)	-0.43 (-2.75 to 1.94)	0.490	1.12 (-0.75 to 3.04)	-0.28 (-2.34 to 1.83)	0.305
Late childhood vs Very low	1.99 (0.22 to 3.80)	1.86 (-0.20 to 3.96)	0.767	1.67 (0.04 to 3.32)	3.15 (1.29 to 5.04)	0.198
Persistently high vs Very low	0.81 (-0.48 to 2.12)	0.68 (-0.96 to 2.34)	0.989	0.81 (-0.38 to 2.00)	0.25 (-1.24 to 1.76)	0.780
Dampness or mold	(N=260)	(N=216)		(N=260)	(N=216)	
Early life vs Very low	2.16 (0.31 to 4.03)	2.95 (0.68 to 5.28)	0.343	1.03 (-0.63 to 2.72)	0.79 (-1.20 to 2.83)	0.872
Moderate late childhood vs Very low	-2.87 (-4.58 to -1.13)	-1.69 (-3.49 to 0.14)	0.396	-3.88 (-5.41 to -2.33)	-1.49 (-3.14 to 0.19)	0.022
Mid-childhood vs Very low	-2.91 (-5.90 to 0.17)	0.41 (-2.57 to 3.49)	0.162	-4.26 (-6.98 to -1.47)	0.55 (-2.16 to 3.34)	0.005

Table E6. Adjusted associations of longitudinal patterns of SHS, pet, and dampness or mold exposure with FEV₁ and FVC at ages 12 and 16 stratified by sex.

Adjusted for log transformations of height, weight and age at medical examination, parental education, maternal and paternal allergy, breastfeeding at 12 weeks, maternal smoking during pregnancy, average annual NO₂ exposure at birth address, birthweight, indoor SHS at 1 year (except in models with SHS exposure), use of gas for cooking at

3 months, dampness or mold in the child's home at 1 year except in models with dampness or mold exposure, pets in the home at 1 year(except in models with pet exposure),

	FEV ₁ growth/year		P-Value*	FVC % growth/year		P-Value*
	Non-allergic parents	Allergic parents		Non-allergic parents	Allergic parents	
SHS	N=235	N=291		N=235	N=291	
Early life vs Very low	0.23 (-0.18 to 0.65)	0.38 (-0.09 to 0.85)	0.979	0.20 (-0.18 to 0.58)	0.44 (-0.03 to 0.91)	0.241
Persistently low vs Very low	-0.04 (-0.52 to 0.43)	0.48 (0.05 to 0.91)	0.095	0.01 (-0.43 to 0.46)	0.52 (0.08 to 0.95)	0.984
Childhood vs Very low	-0.41 (-0.82 to -0.01)	-0.31 (-0.76 to 0.15)	0.985	0.09 (-0.28 to 0.47)	-0.19 (-0.65 to 0.28)	0.486
Pets	N=234	N=290		N=234	N=290	
Early life vs Very low	-0.00 (-0.41 to 0.40)	-0.08 (-0.41 to 0.25)	0.385	-0.37 (-0.74 to 0.01)	-0.24 (-0.58 to 0.09)	0.902
Mid-childhood vs Very low	-0.33 (-0.75 to 0.09)	0.22 (-0.22 to 0.66)	0.078	-0.49 (-0.88 to -0.10)	0.47 (0.02 to 0.92)	0.001
Late childhood vs Very low	0.13 (-0.25 to 0.51)	0.74 (0.38 to 1.11)	0.035	-0.25 (-0.60 to 0.10)	-0.01 (-0.38 to 0.36)	0.545
Persistently high vs Very low	0.11 (-0.18 to 0.41)	-0.60 (-0.88 to -0.31)	0.000	-0.22 (-0.49 to 0.05)	-0.38 (-0.66 to -0.09)	0.173
Dampness or mold	N=241	N=293		N=241	N=293	
Early life vs Very low	-0.73 (-1.12 to -0.34)	-0.79 (-1.19 to -0.39)	0.581	-0.56 (-0.92 to -0.20)	-0.46 (-0.86 to -0.05)	0.710
Moderate late childhood vs Very low	0.19 (-0.18 to 0.55)	-0.05 (-0.40 to 0.30)	0.385	0.10 (-0.23 to 0.44)	-0.17 (-0.52 to 0.19)	0.470
Mid-childhood vs Very low	-0.04 (-0.66 to 0.58)	0.05 (-0.51 to 0.61)	0.862	-0.46 (-1.03 to 0.12)	-0.13 (-0.69 to 0.44)	0.307

respiratory infections in the past 3 weeks before medical examination. *P-value of interaction terms

Table E7. Associations of SHS, pet, and dampness or mold exposure with FEV₁ and FVC growth between age 12 and 16 stratified by parental allergy. Associations are presented as annual percent growth of FEV₁ and FVC

Adjusted for log transformations of differences in height, weight and age at medical examination, parental education, breastfeeding at 12 weeks, maternal smoking during pregnancy, average annual NO₂ exposure at birth address, birthweight, SHS at 1 year (except in models with SHS exposure), use of gas for cooking at 3 months, dampness or mold in the child's home at 1 year (except in models with dampness or mold exposure), pets in the home at 1 year(except in models with pet exposure), respiratory infections in the past 3 weeks before medical examination.

*P-value of interaction terms

	Non-allergic parents	Allergic parents	P-value*	Non-allergic parents	Allergic parents	P-value*
% Difference in FEV₁	12 years			16 years		
SHS	N=235	N=292		N=235	N=292	
Early life vs Very low	-0.25 (-2.33 to 1.87)	-3.26 (-5.72 to -0.75)	0.055	2.41 (0.10 to 4.76)	-2.16 (-4.52 to 0.26)	0.005
Persistently low vs Very low	-0.58 (-3.01 to 1.91)	-1.92 (-4.24 to 0.46)	0.471	-0.15 (-2.77 to 2.54)	-1.27 (-3.45 to 0.96)	0.643
Childhood vs Very low	-1.13 (-3.17 to 0.95)	-0.63 (-3.15 to 1.97)	0.860	-2.22 (-4.36 to -0.03)	-0.75 (-3.16 to 1.72)	0.641
% Difference in FVC						
Early life vs Very low	-0.52 (-2.41 to 1.41)	-4.48 (-6.79 to -2.12)	0.001	1.93 (0.00 to 3.89)	-3.00 (-5.00 to -0.96)	0.000
Persistently low vs Very low	0.20 (-2.03 to 2.48)	-3.64 (-5.82 to -1.42)	0.006	0.90 (-1.32 to 3.17)	-2.35 (-4.19 to -0.47)	0.002
Childhood vs Very low	-2.40 (-4.23 to -0.54)	-0.96 (-3.36 to 1.50)	0.587	-1.76 (-3.57 to 0.08)	-1.12 (-3.17 to 0.98)	0.871
Pets	N=234	N=291		N=234	N=291	
% Difference in FEV₁						
Early life vs Very low	2.40 (0.32 to 4.52)	-2.05 (-3.83 to -0.23)	0.001	3.09 (0.80 to 5.43)	-1.61 (-3.31 to 0.11)	0.000
Mid-childhood vs Very low	4.23 (2.00 to 6.51)	-1.10 (-3.49 to 1.35)	0.000	3.85 (1.46 to 6.29)	-1.30 (-3.54 to 1.00)	0.001
Late childhood vs Very low	4.05 (2.03 to 6.11)	1.64 (-0.37 to 3.69)	0.253	4.74 (2.56 to 6.96)	5.23 (3.26 to 7.24)	0.664
Persistently high vs Very low	1.64 (0.14 to 3.16)	0.99 (-0.59 to 2.60)	0.372	2.77 (1.11 to 4.46)	-0.00 (-1.48 to 1.50)	0.007
% Difference in FVC						
Early life vs Very low	3.92 (2.01 to 5.87)	-1.92 (-3.63 to -0.17)	<0.001	3.56 (1.63 to 5.52)	-2.25 (-3.71 to -0.78)	<0.001
Mid-childhood vs Very low	2.32 (0.34 to 4.34)	-2.17 (-4.44 to 0.15)	0.000	1.97 (0.01 to 3.98)	-1.76 (-3.70 to 0.21)	0.009
Late childhood vs Very low	3.63 (1.80 to 5.48)	0.91 (-1.00 to 2.86)	0.045	3.58 (1.78 to 5.41)	1.17 (-0.47 to 2.84)	0.096
Persistently high vs Very low	1.77 (0.40 to 3.15)	-0.10 (-1.60 to 1.43)	0.037	2.15 (0.77 to 3.55)	-0.78 (-2.05 to 0.50)	0.003
Dampness or mold.	N=241	N=294		N=241	N=294	
% Difference in FEV₁						
Early life vs Very low	0.80 (-1.20 to 2.84)	3.53 (1.24 to 5.86)	0.036	-1.72 (-3.83 to 0.43)	1.37 (-0.78 to 3.56)	0.057
Moderate late childhood vs Very low	-4.37 (-6.17 to -2.54)	-1.34 (-3.22 to 0.57)	0.018	-3.38 (-5.33 to -1.38)	-2.38 (-4.19 to -0.54)	0.444
Mid-childhood vs Very low	-0.16 (-3.39 to 3.18)	-4.74 (-7.66 to -1.72)	0.006	0.37 (-3.10 to 3.97)	-4.42 (-7.25 to -1.50)	0.018
% Difference in FVC						
Early life vs Very low	3.30 (1.45 to 5.18)	2.29 (0.12 to 4.51)	0.494	1.31 (-0.50 to 3.16)	0.82 (-1.01 to 2.68)	0.816
Moderate late childhood vs Very low	-3.32 (-4.96 to -1.65)	-0.68 (-2.50 to 1.18)	0.017	-2.91 (-4.56 to -1.24)	-1.70 (-3.26 to -0.12)	0.171
Mid-childhood vs Very low	2.04 (-0.93 to 5.11)	-2.45 (-5.33 to 0.51)	0.021	0.04 (-2.86 to 3.02)	-2.85 (-5.32 to -0.31)	0.165

Table E8. Adjusted associations of SHS, pet, and dampness or mold exposure with FEV₁ and FVC at ages 12 and 16 stratified by parental allergy. Associations are presented as % difference.

Adjusted for log transformations of height, weight and age at medical examination, parental education, breastfeeding at 12 weeks, maternal smoking during pregnancy, average annual NO₂ exposure at birth address, birthweight, indoor SHS at 1 year (except in models with SHS exposure), use of gas for cooking at 3 months, dampness or mold

in the child's home at 1 year except in models with dampness or mold exposure, pets in the home at 1 year(except in models with pet exposure), respiratory infections in the past 3 weeks before medical examination.

*P-value of interaction terms

N=212	% FEV ₁ growth (95% CI)	% in FVC growth (95% CI)
SHS		
Early life vs Very low	0.15 (-0.33 to 0.64)	0.52 (0.04 to 1.01)
Persistently low vs Very low	0.54 (-0.00 to 1.09)	0.64 (0.10 to 1.19)
Childhood vs Very low	-1.04 (-1.50 to -0.58)	-0.87 (-1.32 to -0.41)
Pets		
Early life vs Very low	0.73 (0.37 to 1.09)	-0.15 (-0.50 to 0.20)
Mid-childhood vs Very low	-0.11 (-0.58 to 0.36)	-0.46 (-0.93 to 0.01)
Late childhood vs Very low	0.57 (0.18 to 0.96)	-0.12 (-0.50 to 0.27)
Persistently high vs Very low	-0.29 (-0.57 to -0.01)	-0.32 (-0.60 to -0.04)
Dampness or mold N=215		
Early life vs Very low	-0.71 (-1.13 to -0.29)	-0.04 (-0.46 to 0.38)
Moderate late childhood vs Very low	0.24 (-0.10 to 0.57)	0.06 (-0.26 to 0.40)
Mid-childhood vs Very low	0.29 (-0.44 to 1.02)	-0.07 (-0.78 to 0.65)

Table E9. Adjusted associations of SHS, pet, and dampness or mold exposure with FEV₁ and FVC growth between age 12 and 16 excluding participants with respiratory infections during the 3 weeks preceding lung function measurements. Associations are presented as annual percent growth of FEV₁ and FVC

Associations adjusted for sex, log transformation of differences in height, weight and age between the 12 and 16 year lung function measurements, parental education, maternal and paternal allergy, breastfeeding at 12 weeks, maternal smoking during pregnancy, average annual NO₂ exposure at birth address, birthweight, indoor SHS at 1 year, use of gas for cooking at 3 months, dampness or mold in the child's home at 1 year, pets in the home at 1 year.

	% Difference in FEV ₁ (95% CI)		% Difference in FVC (95% CI)	
	AGE 12	AGE 16	AGE 12	AGE 16
SHS	N=350	N=307	N=350	N=307
Early life vs Very low	-1.34 (-3.27 to 0.62)	-0.63 (-2.60 to 1.39)	-3.33 (-5.20 to -1.43)	-1.03 (-2.77 to 0.73)
Persistently low vs Very low	-1.80 (-3.87 to 0.31)	-2.43 (-4.50 to -0.32)	-0.71 (-2.78 to 1.41)	-2.13 (-3.96 to -0.27)
Childhood vs Very low	-0.35 (-2.24 to 1.58)	-2.69 (-4.79 to -0.54)	-0.00 (-1.89 to 1.92)	-1.84 (-3.71 to 0.07)
Pets	N=370	N=319	N=370	N=319
Early life vs Very low	-1.33 (-2.82 to 0.19)	-0.25 (-1.92 to 1.45)	-0.70 (-2.19 to 0.82)	-2.23 (-3.68 to -0.77)
Mid-childhood vs Very low	0.17 (-1.85 to 2.22)	-0.78 (-2.88 to 1.36)	-2.72 (-4.66 to -0.73)	-2.42 (-4.24 to -0.57)
Late childhood vs Very low	3.94 (2.26 to 5.65)	2.23 (0.38 to 4.11)	2.69 (1.04 to 4.37)	-0.40 (-1.99 to 1.22)
Persistently high vs Very low	1.31 (0.04 to 2.59)	1.07 (-0.26 to 2.42)	0.70 (-0.55 to 1.98)	-0.16 (-1.32 to 1.01)
Dampness or mold	N=356	N=311	N=356	N=311
Early life vs Very low	2.63 (0.86 to 4.43)	-1.44 (-3.42 to 0.59)	3.03 (1.26 to 4.82)	-0.49 (-2.27 to 1.32)
Moderate late childhood vs Very low	-3.46 (-4.86 to -2.04)	-2.29 (-3.83 to -0.72)	-2.74 (-4.14 to -1.32)	-2.95 (-4.31 to -1.57)
Mid-childhood vs Very low	-3.93 (-7.04 to -0.72)	-5.83 (-8.41 to -3.18)	-1.43 (-4.60 to 1.85)	-4.21 (-6.54 to -1.83)

0 **Table E10. Adjusted associations of SHS, pet, and dampness or mold exposure with FEV₁ and FVC at ages 12 and 16 excluding participants with respiratory infections**
1 **during the 3 weeks preceding lung function measurements.**

2 Associations adjusted for sex, difference in height, weight and age between the 12 and 16 year lung function measurements, parental education, maternal and paternal
3 allergy, breastfeeding at 12 weeks, maternal smoking during pregnancy, average annual NO₂ exposure at birth address, birthweight, indoor SHS at 1 year, use of gas for
4 cooking at 3 months, dampness or mold in the child's home at 1 year, pets in the home at 1 year.

5

	% Difference in FEV ₁ (95% CI)		% FEV ₁ growth (95% CI)
	AGE 12	AGE 16	
SHS			
Early life vs Very low	-1.63 (-3.48 to 0.25)	0.17 (-1.66 to 2.03)	0.42 (0.05 to 0.81)
Persistently low vs Very low	-2.34 (-4.13 to -0.50)	-1.35 (-3.12 to 0.46)	0.29 (-0.08 to 0.66)
Childhood vs Very low	-0.74 (-2.47 to 1.03)	-1.75 (-3.42 to -0.05)	-0.53 (-0.88 to -0.18)
Pets			
Early life vs Very low	-0.25 (-1.85 to 1.37)	1.05 (-0.51 to 2.64)	0.19 (-0.12 to 0.50)
Mid-childhood vs Very low	1.66 (-0.15 to 3.49)	1.38 (-0.38 to 3.16)	-0.17 (-0.51 to 0.18)
Late childhood vs Very low	2.24 (0.73 to 3.77)	4.03 (2.53 to 5.54)	0.38 (0.09 to 0.67)
Persistently high vs Very low	0.88 (-0.31 to 2.09)	1.13 (-0.04 to 2.31)	-0.14 (-0.37 to 0.09)
Dampness or mold			
Early life vs Very low	2.64 (0.96 to 4.35)	0.20 (-1.42 to 1.84)	-0.74 (-1.05 to -0.43)
Moderate late childhood vs Very low	-3.11 (-4.52 to -1.68)	-2.29 (-3.69 to -0.88)	0.15 (-0.13 to 0.43)
Mid-childhood vs Very low	-2.01 (-4.35 to 0.39)	-2.00 (-4.28 to 0.35)	-0.28 (-0.73 to 0.18)
	% Difference in FVC (95% CI)		% FVC growth (95% CI)
	AGE 12	AGE 16	
SHS			
Early life vs Very low	-3.77 (-5.52 to -1.99)	-1.87 (-3.48 to -0.23)	0.46 (0.09 to 0.82)
Persistently low vs Very low	-1.98 (-3.73 to -0.20)	-1.78 (-3.37 to -0.17)	0.06 (-0.30 to 0.41)
Childhood vs Very low	-1.29 (-2.95 to 0.41)	-1.59 (-3.10 to -0.06)	-0.35 (-0.68 to -0.01)
Pets			
Early life vs Very low	0.30 (-1.26 to 1.88)	0.14 (-1.27 to 1.56)	-0.16 (-0.47 to 0.14)
Mid-childhood vs Very low	1.11 (-0.64 to 2.87)	0.79 (-0.79 to 2.39)	-0.19 (-0.53 to 0.15)
Late childhood vs Very low	1.08 (-0.37 to 2.54)	1.42 (0.10 to 2.75)	-0.07 (-0.35 to 0.21)
Persistently high vs Very low	0.23 (-0.29 to 1.39)	-0.15 (-1.20 to 0.90)	-0.32 (-0.55 to -0.10)
Dampness or mold			
Early life vs Very low	3.01 (1.38 to 4.68)	1.31 (-0.16 to 2.80)	-0.57 (-0.87 to -0.26)
Moderate late childhood vs Very low	-2.00 (-3.38 to -0.61)	-2.07 (-3.32 to -0.80)	-0.02 (-0.29 to 0.25)
Mid-childhood vs Very low	1.46 (-0.89 to 3.86)	-1.04 (-3.11 to 1.08)	-0.73 (-1.17 to -0.29)

6 **Table E11. Adjusted associations of longitudinal patterns of SHS, pet, and dampness or mold exposure with FEV₁ and FVC at ages 12 and 16 and FEV₁ and FVC growth**
7 **between 12 and 16 years excluding childhood asthmatics (until age 8) and those who avoided pets due to family allergies (N=129).**

8 Adjusted for sex, log transformations of height, weight and age at medical examination, parental education, maternal and paternal allergy, breastfeeding at 12 weeks, ,
9 maternal smoking during pregnancy, average annual NO₂ exposure at birth address, birthweight, indoor SHS at 1 year (except in models with SHS exposure), use of gas for

- 10 cooking at 3 months, dampness or mold in the child's home at 1 year (except in models with dampness or mold exposure), pets in the home at 1 year(except in models with
11 pet exposure), respiratory infections in the past 3 weeks before medical examination.

N=463		% Difference in FEV ₁ (95% CI)		% FEV ₁ growth (95% CI)
SHS		AGE 12	AGE 16	
Early life vs Very low		-1.20 (-2.85 to 0.48)	0.78 (-0.90 to 2.48)	0.34 (0.02 to 0.66)
Persistently low vs Very low		-2.23 (-4.14 to -0.28)	-1.25 (-3.14 to 0.68)	0.21 (-0.16 to 0.58)
Childhood vs Very low		-0.77 (-2.54 to 1.02)	-1.13 (-2.87 to 0.64)	-0.38 (-0.71 to -0.05)
Pets				
Early life vs Very low		-0.05 (-1.51 to 1.43)	0.46 (-0.99 to 1.92)	-0.03 (-0.30 to 0.24)
Mid-childhood vs Very low		1.60 (-0.11 to 3.35)	1.05 (-0.63 to 2.76)	-0.10 (-0.41 to 0.21)
Late childhood vs Very low		2.75 (1.23 to 4.29)	4.84 (3.32 to 6.39)	0.38 (0.10 to 0.65)
Persistently high vs Very low		1.42 (0.26 to 2.60)	1.00 (-0.15 to 2.16)	-0.30 (-0.51 to -0.09)
Dampness or mold				
Early life vs Very low		2.48 (0.84 to 4.14)	0.35 (-1.25 to 1.98)	-0.71 (-1.01 to -0.42)
Moderate late childhood vs Very low		-2.97 (-4.36 to -1.56)	-2.97 (-4.36 to -1.56)	0.01 (-0.25 to 0.28)
Mid-childhood vs Very low		-1.05 (-3.44 to 1.40)	-0.24 (-2.65 to 2.22)	-0.08 (-0.52 to 0.37)
		% Difference in FVC (95% CI)		% FVC growth (95% CI)
		AGE 12	AGE 16	
SHS				
Early life vs Very low		-2.37 (-3.91 to -0.80)	-0.86 (-2.27 to 0.57)	0.25 (-0.06 to 0.56)
Persistently low vs Very low		-1.68 (-3.50 to 0.18)	-0.63 (-2.26 to 1.03)	0.17 (-0.20 to 0.53)
Childhood vs Very low		-2.00 (-3.65 to -0.32)	-1.23 (-2.72 to 0.28)	-0.05 (-0.38 to 0.28)
Pets				
Early life vs Very low		0.70 (-0.69 to 2.11)	-0.10 (-1.34 to 1.14)	-0.29 (-0.56 to -0.03)
Mid-childhood vs Very low		0.30 (-1.31 to 1.93)	0.07 (-1.37 to 1.52)	0.00 (-0.31 to 0.31)
Late childhood vs Very low		2.31 (0.87 to 3.76)	2.19 (0.91 to 3.48)	-0.17 (-0.44 to 0.10)
Persistently high vs Very low		1.08 (-0.02 to 2.19)	0.24 (-0.74 to 1.23)	-0.37 (-0.57 to -0.16)
Dampness or mold				
Early life vs Very low		3.03 (1.48 to 4.61)	1.09 (-0.28 to 2.48)	-0.60 (-0.89 to -0.31)
Moderate late childhood vs Very low		-2.29 (-3.62 to -0.95)	-3.05 (-4.22 to -1.85)	-0.14 (-0.40 to 0.12)
Mid-childhood vs Very low		0.72 (-1.58 to 3.08)	-0.20 (-2.25 to 1.88)	-0.60 (-0.89 to -0.31)

12 **Table E12. Adjusted associations of longitudinal patterns of SHS, pet, and dampness or mold exposure with FEV₁ and FVC at ages 12 and 16 and FEV₁ and FVC growth**
13 **between age 12 and 16 excluding smokers(N=44).**

14 Adjusted for sex, log transformations of height, weight and age at medical examination, parental education, maternal and paternal allergy, breastfeeding at 12 weeks, ,
15 maternal smoking during pregnancy, average annual NO₂ exposure at birth address, birthweight, indoor SHS at 1 year (except in models with SHS exposure), use of gas for

16 cooking at 3 months, dampness or mold in the child's home at 1 year (except in models with dampness or mold exposure), pets in the home at 1 year(except in models with
17 pet exposure), respiratory infections in the past 3 weeks before medical examination.

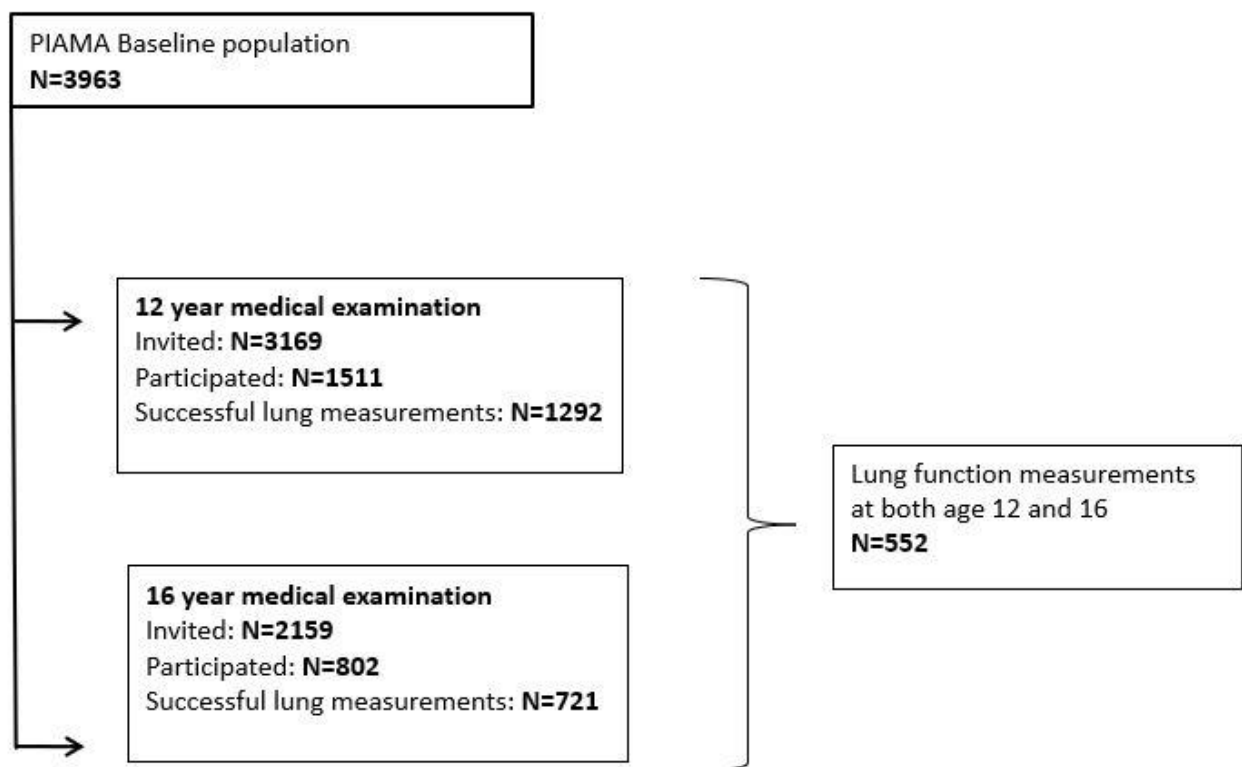
	Odds ratios (95% CI)	
	Any asthma (N=525)	Any rhinitis (N=256)
Pets		
Very low vs Late childhood	2.10 (0.70 to 6.36)	1.50 (0.51 to 4.37)
Early life vs Late childhood	2.79 (0.82 to 9.49)	2.60 (0.71 to 9.45)
Mid-childhood vs Late childhood	1.09 (0.23 to 5.24)	0.57 (0.11 to 2.91)
Persistently high vs Late childhood	3.17 (1.03 to 9.75)	0.51 (0.15 to 1.74)
Cats		
Very low vs Late childhood	5.61 (0.74 to 42.37)	4.07 (0.47 to 34.78)
Early life vs Late childhood	3.81 (0.42 to 33.29)	4.59 (0.40 to 51.06)
Persistently high vs Late childhood	5.94 (0.73 to 48.08)	1.75 (0.17 to 17.2)
Rodents		
Very low vs Late childhood	1.10 (0.54 to 2.24)	2.39 (1.00 to 5.70)
Early life vs Late childhood	1.23 (0.34 to 4.40)	1.06 (0.16 to 6.82)
Mid-childhood vs Late childhood	0.99 (0.25 to 3.96)	2.93 (0.56 to 15.34)

19

20 **Table E13. Association of childhood asthma and rhinitis during the first 8 years of life with exposure pattern**
21 **membership vs late childhood membership, for pet exposure and separately for cats and rodent exposure.**
22 **Associations are presented as odds ratios.**

23 Adjusted for sex, log transformations of height, weight and age at medical examination, parental education,
24 maternal and paternal allergy, breastfeeding at 12 weeks, maternal smoking during pregnancy, average annual
25 NO₂ exposure at birth address, birthweight, indoor SHS at 1 year, use of gas for cooking at 3 months, dampness
26 or mold in the child's home at 1 year, respiratory infections in the past 3 weeks before medical examination.

27



28
29 **Figure E1. Flow diagram of study population from the baseline population**

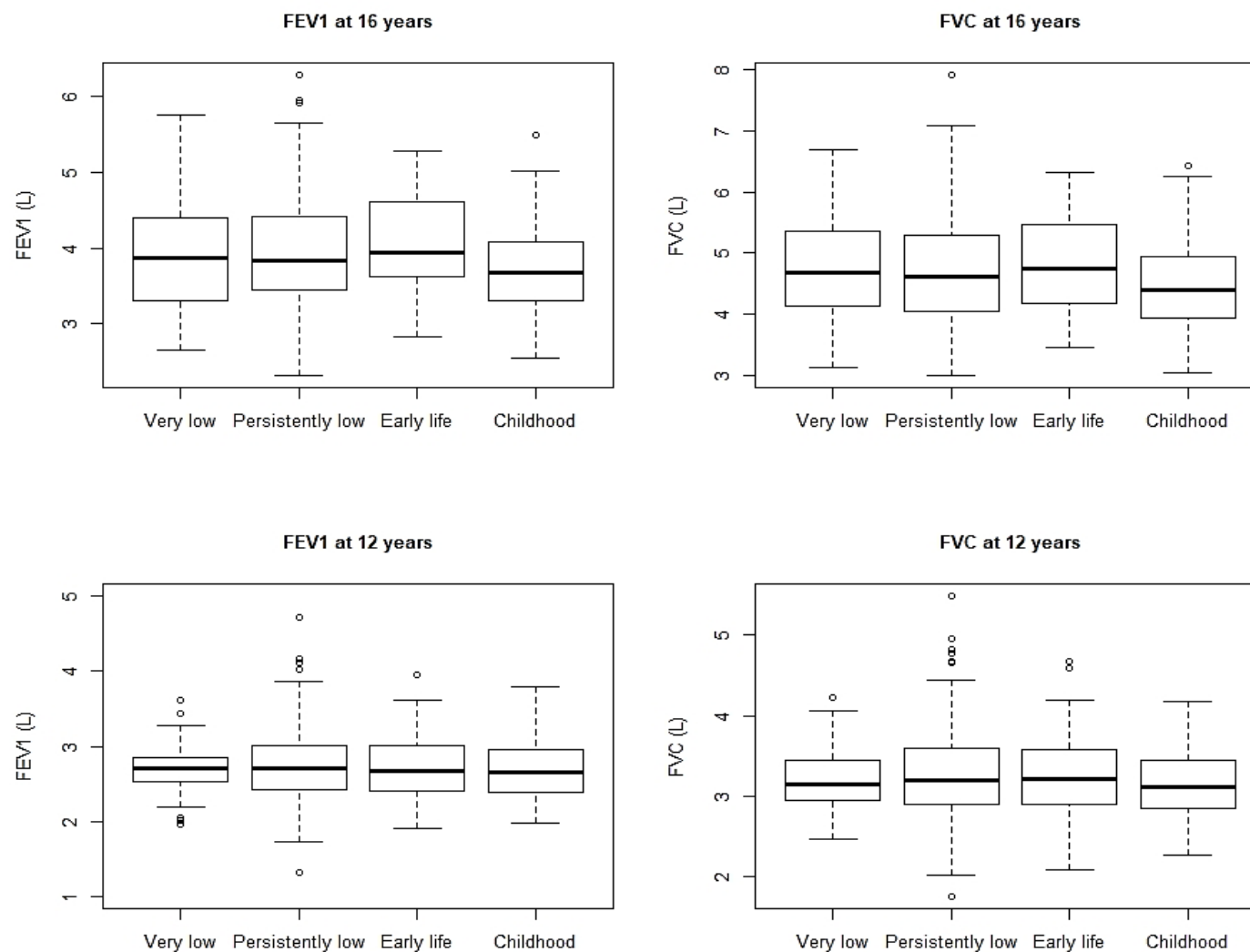


Figure E2. Boxplots of FEV₁ and FVC values vs patterns of secondhand smoke (SHS) exposure. *Allocation to exposure pattern based on the largest posteriori probability

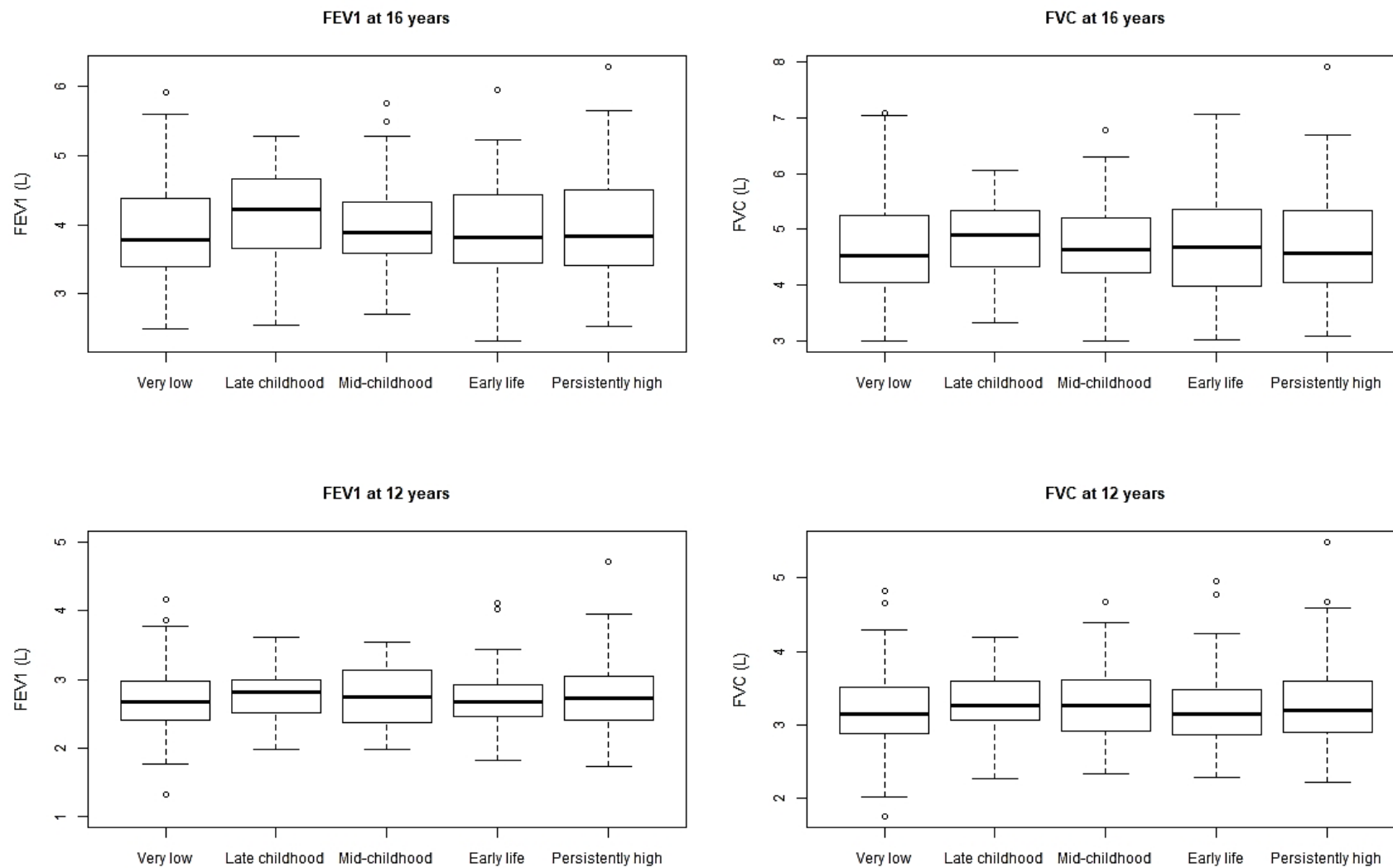


Figure E3. Boxplots of FEV₁ and FVC values vs pattern of for pet exposure. *Allocation to exposure pattern based on the largest posteriori probability

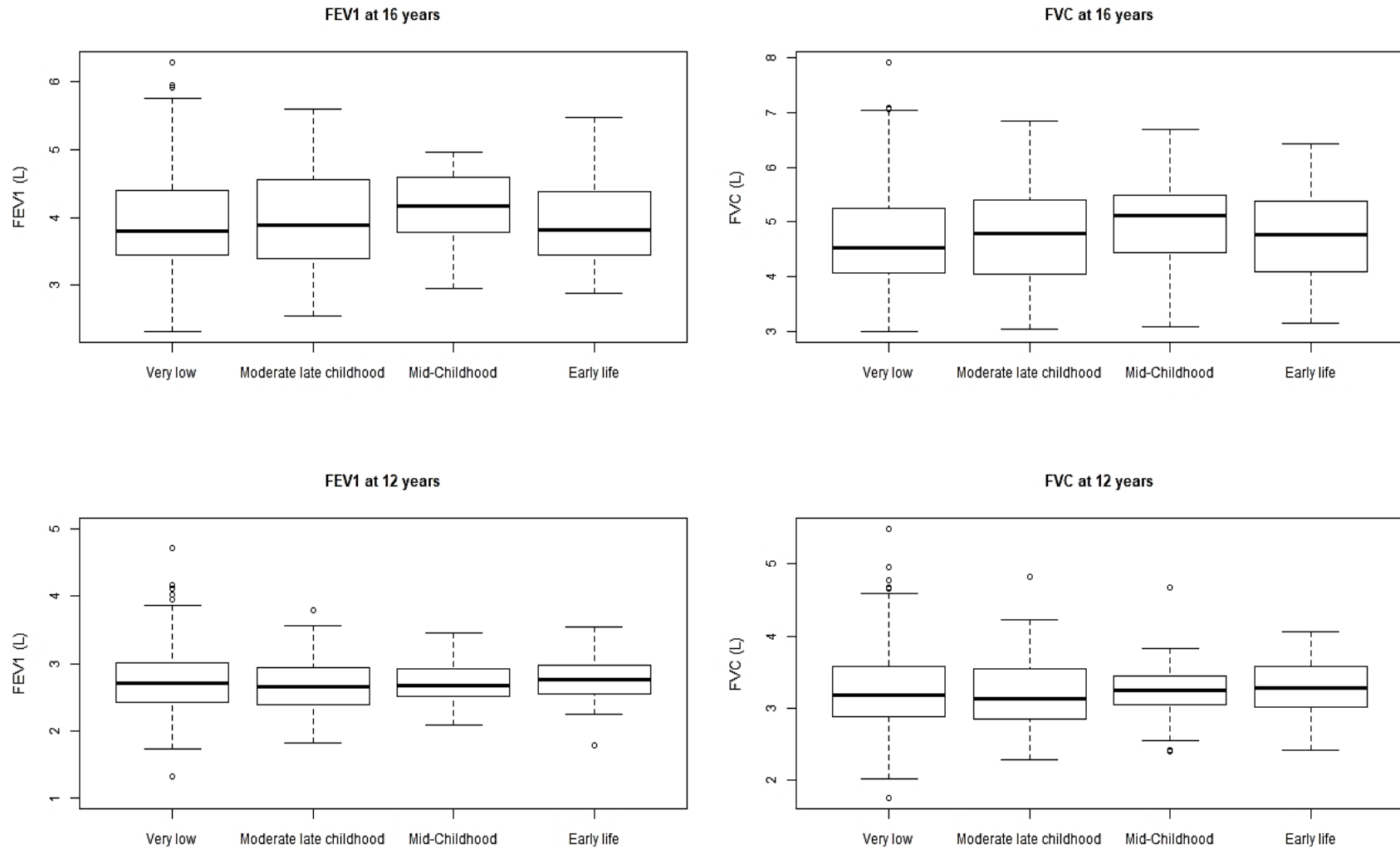


Figure E4. Boxplots of FEV1 and FVC values vs pattern of dampness or mold exposure. *Allocation to exposure pattern based on the largest posteriori probability

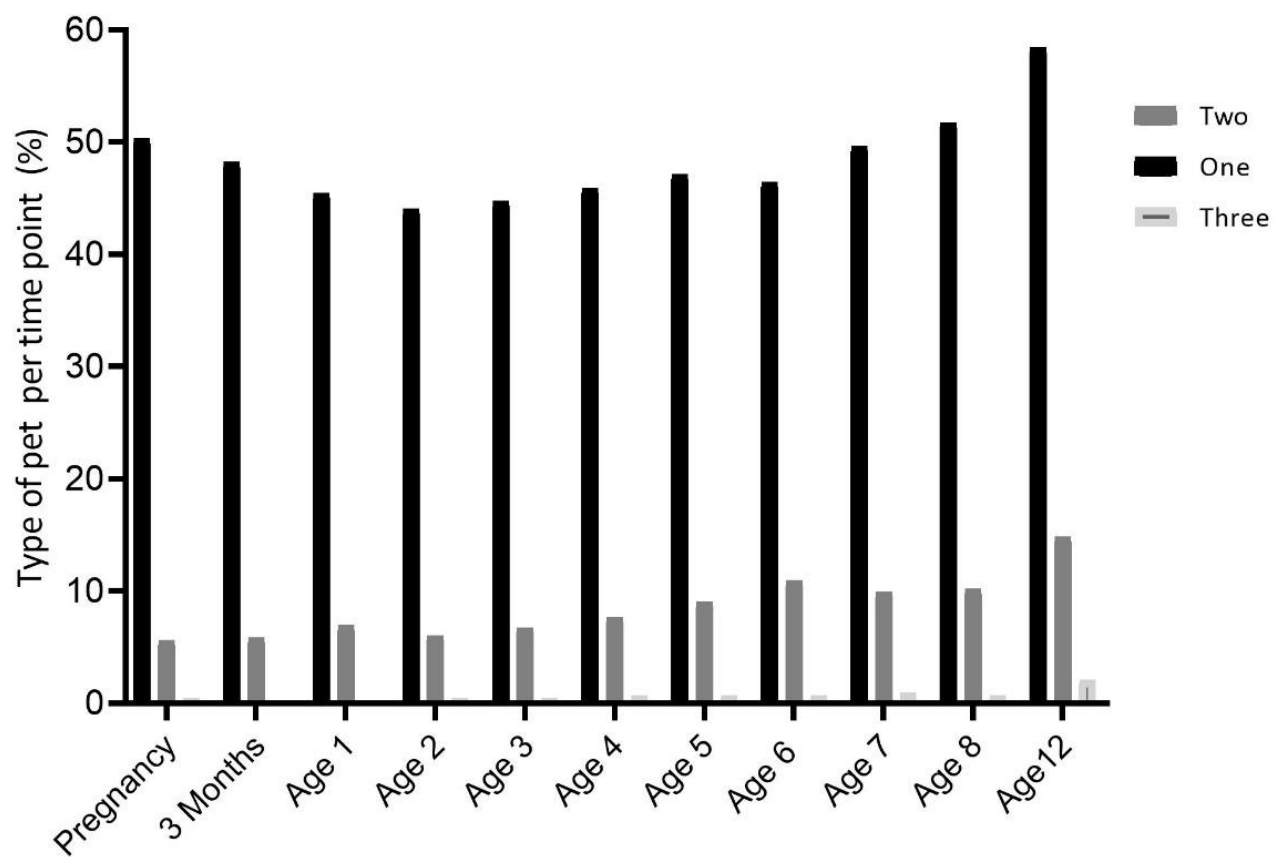


Figure E5: Number of different pets (cat, dog, rodent) owned per time point.